INDEPENDENT RELEASE VERIFICATION AND VALIDATION PLAN (IRVVP) ECS INTERIM RELEASE 1 (IR-1)

Final

(Deliverable 0601/IR-1)

March 31, 1995

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1. INTRODUCTION

1.1 Purpose

The purpose of this Independent Release Verification and Validation Plan (IRVVP) for the EOSDIS Core System (ECS) Interim Release 1 (IR-1) is to document:

1. The organizational relationships between IV&V and the ESDIS Project and ECS developer, Hughes Applied Information Systems (HAIS),
2. The results of an ECS IR-1 Criticality Analysis and Risk Assessment (CARA),
3. The IR-1 specific IV&V level-of-effort activities to be performed,
4. The programmatic aspects of the EOSDIS IV&V ECS IR-1 development analysis effort (schedule and resource allocation), and
5. The reporting mechanisms to be employed.

Section 2 documents the organizational relationships and CARA results. Section 3 documents the lifecycle dependent activities. Appendices A and B document the programmatic aspects of the effort. Appendix C documents the reporting mechanisms.

1.2 Scope

The current IRVVP scope of IV&V analyses of the ECS IR-1 is as follows:

- Perform an ECS design technical integrity analysis (traceability, quality, testability) and generate a final Design Evaluation Technical Analysis Report (TAR) three months after ECS Rel A PDR. The analysis is limited to those design elements supporting IR-1. Traceability will be analyzed between the level 4 requirements and design elements; quality and testability will be analyzed.

- Perform an ECS software development technical integrity analysis (traceability and quality) and generate a final Software Development Evaluation TAR one month prior to the start of IR-1 system I&T. The analysis is limited to those facility hardware, software, interfaces, communications, operational procedures, etc. supporting IR-1. Traceability will be analyzed between the design elements and the implementation elements; quality will be analyzed for the implementation elements.

- Perform an ECS test plans/procedures technical integrity analysis (traceability and quality) and generate a final Test Plans/Procedures Evaluation TAR by the start of IR-1 system I&T. The analysis is limited to those test plans/procedures supporting IR-1.

- Witness ECS IR-1 testing (system Integration & Test (I&T)) and assess the technical integrity (quality) of the test results. Generate a Test Results Evaluation TAR at the end of IR-1 system I&T.

1.3 ECS Interim Release 1 Capability Overview

ECS IR-1 consists of capabilities which support early interface testing of the Tropical Rainfall Measurement Mission (TRMM), scheduled for launch in August 1997. ECS provides data archive services for the following TRMM instruments: PR, TMI, VIRS, CERES, and LIS. The TSDIS sends Level 1 (L1) data to ECS for all the instruments, except CERES and LIS, for which Level 0 (L0) data is provided to ECS by the SDPF. In addition, ECS provides the production facilities for L0 to L1 and higher level (L2/3/4) processing for CERES and LIS. The PR, TMI and LIS instrument data are physically archived at the MSFC DAAC; VIRS data is physically archived at the GSFC DAAC; CERES data is physically archived at the LaRC DAAC. It is critical that these capabilities be available at the GSFC, MSFC, and LaRC DAACs to support early integration and test of the TRMM Ground System.

2. LIFE CYCLE PHASE INDEPENDENT ACTIVITIES

Life cycle phase independent IV&V activities for ECS IR-1 are those whose execution is independent of the particular life cycle phase in which they are executed. This section addresses the organizational interfaces and mechanisms and Criticality Analysis and Risk Assessment (CARA) for ECS IR-1.

2.1 Organizational Interfaces and Mechanisms

HAIS is currently conducting a major reorganization which changes their organizational focus from ECS segments to ECS releases. This reorganization may also have an effect on the IV&V Team's day-to-day interfaces to the ESDIS Project. Until the process is complete (currently very late March to early April 1995) it is not practical to define IV&V interfaces and mechanisms. This IRVVP will be updated when HAIS's organizational realignment is complete, to describe the most effective IV&V-to-ESDIS/HAIS interfaces.

The EOSDIS IV&V Team has requested and has received approval for an on-site (HAIS) presence to facilitate communication and access to information. This IRVVP will be updated when the details are complete and will describe how on-site interaction will be conducted.

2.2 Critical Analysis and Risk Assessment (CARA)

One of the initial steps in planning and allocating IV&V resources to a release effort is to perform a Criticality Analysis and Risk Assessment (CARA) study. The outcome of the study allows the IV&V team to assign priorities to the various release components and thus ensuring that the most critical areas receive adequate coverage. Section 2.2 of the Independent System Verification and Validation Plan (ISVVP) **[2]** details the methodology for performing a CARA.

The CARA effort was performed on March 10, 1995 by two teams, each with 5 individuals, which performed both the analysis and evaluation of the associated procedures. Lessons learned will be identified and incorporated in future CARAs as applicable. The teams evaluated the Configuration Items (CIs), Segment Integration and Testing (I&T) Functional Threads, and the System Integration and Test Functional Threads for IR-1 using the ECS documentation referenced in Appendix D. These IR-1 components were then rated in various critical and risk areas using the criteria described in Exhibit 2-1.

CRITICALITY RATING	DESCRIPTION
4	Catastrophic
3	Serious
2	Moderate
1	Low

EXHIBIT 2-1: Criticality Ratings

RISK RATING	DESCRIPTION
3	High
2	Medium
1	Low

EXHIBIT 2-2: Risk Ratings

Once ratings were assigned to the different criticality and risk categories, composite scores were calculated leading ultimately to an overall CARA rating on a scale of 1 to 12, where high scores indicate areas of concern. In summary, the analysis produced the following results:

- **At the Subsystem Level, the Science and Data Processing Segment (SDPS) Data Processing Subsystem (DPS) received the highest CARA rating (3.6).** As stated in the SDPS Design Specification **[9]**, this subsystem manages product generation and associated operational environment, as well as also providing the algorithm integration and testing environment for the introduction of science software into the EOSDIS. The importance of these two areas to the science user community contributed to the high rating for this function.

- **At the CI level, the SDPS Processing CSCI (PRONG) recorded the highest CARA rating (4.4).** This CI provides the services for managing and monitoring the Science Data Processing environment which in turn is used by the instrument teams for generating data products. Again the importance of meeting the science user requirements was evident in the high ratings given to this CI, especially in composite risk where it received a 2.2 rating.

- **Also to be noted at the CI level, the SDPS Ingest Subsystem (INS) Ingest CI (INGST) received the highest risk rating (2.7) in the Engineering Complexity area.** INGST is responsible for the receipt and physical storage of data at the sites. This function must be able to ingest a wide variety of data types thus resulting in the high risk rating.

- **At the Segment Functional Thread level, three threads recorded equal CARA scores of 4.0: CSMS External Interfaces (Ex IF), Security (Sec), and SDPS Process Queuing and Execution (PQ&E).** Successful integration and testing of these three functions was rated

critical for the success of IR-1. CSMS Sec thread also recorded the highest criticality rating (2.9) in the Operations area leading to the highest criticality rating for the CSMS Functional Threads (2.1). These ratings relay the importance of the security function in the distributed computing and multi-user environments associated with EOSDIS.

The following pages contain exhibits which list the evaluated areas and summarize the CARA results.

Management Application Services Subsystem (MSS)	
MCI	Management CI
MLCI	Management Logistics CI
MACI	Management Agent CI
MHCI	MSS Management H/W CI
Communications Subsystem (CSS)	
DCCI	Distributed Computing CI
DCHCI	Distributed Communication H/W CI

EXHIBIT 2-3: CSMS Segment Configuration Items (CIs)

Ex IF	External Interfaces
Sec	Security
D Svc	Directory/Naming Service
DTS	Distributed Time Service
IntPr	Basic Interprocesses
RPC	Process to Process (RPC Calls)
F Tr	File Transfer
I Msg	Internet Messaging
DCE	DCE Encapsulation
E Log	Event Logging
AP&D	Alarm Processing and Display
CM	Configuration Management

EXHIBIT 2-4: CSMS Integration and Test (I&T) Functional Threads (FTs)

Ingest Subsystem (INS)	
INGST	Ingest CI
Data Processing Subsystem (DPS)	
AITTL	Algorithm Integration and Test CI
PRONG	Processing CI
SDPTK	SDP Toolkit

EXHIBIT 2-5: SDPS Segment Configuration Items (CIs)

PQ&E	Process Queuing and Execution
D Tkt	DAAC Toolkit
AIT T	AIT Tools
T Chk	TRMM Check
T Ing	TRMM Ingest

EXHIBIT 2-6: SDPS Integration and Test (I&T) Functional Threads (FTs)

DAAC LAN
ESN WAN
TRMM SPDF Interface Thread
TRMM TSDIS Interface Thread
AI&T Preparation
ECS Administration

EXHIBIT 2-7: IR-1 System Level Integration and Test Functional Threads (FTs)

Criticality Area		IR-1 Criticality Rating							
	Weight	Overall	CSMS CSS	CSMS MSS	SDPS INS	SDPS DPS	CSMS FT's	SDPS FT's	IR-1 FT's
Operations	0.250	2.0	2.2	1.8	1.9	1.9	1.6	2.2	2.1
Safety	0.250	1.1	1.0	1.1	1.0	1.0	1.1	1.0	1.2
Technical	0.250	1.6	1.3	1.3	1.9	2.1	1.4	1.9	1.4
Programmatics	0.250	1.8	1.8	1.6	2.0	2.0	1.5	1.9	2.0
Composite Criticality	1.000	1.6	1.6	1.5	1.7	1.8	1.4	1.8	1.7
Risk Driver		**IR-1 Risk Rating**							
	Weight	Overall	CSMS CSS	CSMS MSS	SDPS INS	SDPS DPS	CSMS FT's	SDPS FT's	IR-1 FT's
Engineering Complexity	0.167	2.1	2.1	2.1	2.7	2.2	1.8	2.0	1.9
Tech Base Maturity	0.167	1.6	1.7	1.8	1.8	1.6	1.5	1.5	1.5
Requirements Volatility	0.167	1.8	1.3	1.6	2.0	2.3	1.2	2.0	1.9
Experience Base	0.167	1.8	2.0	2.0	1.4	1.7	1.7	1.8	1.8
Testability	0.167	1.8	1.9	2.2	1.7	2.2	1.3	1.9	1.4
Process Complexity	0.167	1.9	2.0	2.0	2.3	1.9	1.6	1.6	1.6
Composite Risk	1.000	1.8	1.8	2.0	2.0	2.0	1.5	1.8	1.7
ECS IR-1 CARA Rating	Weight	Overall	CSMS CSS	CSMS MSS	SDPS INS	SDPS DPS	CSMS FT's	SDPS FT's	IR-1 FT's
	n/a	2.9	2.9	3.0	3.4	3.6	2.1	3.2	2.9

EXHIBIT 2-8: Overall CARA Results for IR-1

Criticality Area		CSMS Criticality Rating							
	Weight	Overall	CSS DCCI	CSS DCHCI	MSS MCI	MSS MLCI	MSS MACI	MSS MHCI	Ftn. Threads
Operations	0.250	1.9	2.3	2.0	2.1	1.3	1.7	2.0	1.6
Safety	0.250	1.1	1.0	1.0	1.2	1.0	1.0	1.1	1.1
Technical	0.250	1.3	1.4	1.2	1.2	1.2	1.5	1.1	1.4
Programmatics	0.250	1.6	2.1	1.4	1.9	1.6	1.4	1.6	1.5
Composite Criticality	1.000	1.5	1.7	1.4	1.6	1.3	1.4	1.5	1.4
Risk Driver		**CSMS Risk Rating**							
	Weight	Overall	CSS DCCI	CSS DCHCI	MSS MCI	MSS MLCI	MSS MACI	MSS MHCI	Ftn. Threads
Engineering Complexity	0.167	2.0	2.0	2.2	2.4	1.5	2.2	2.2	1.8
Tech Base Maturity	0.167	1.7	2.1	1.3	2.2	1.3	1.8	1.8	1.5
Requirements Volatility	0.167	1.5	1.4	1.2	2.0	1.0	1.8	1.7	1.2
Experience Base	0.167	1.9	2.2	1.8	2.0	1.9	1.9	2.0	1.7
Testability	0.167	2.0	1.6	2.2	2.5	1.9	2.2	2.1	1.3
Process Complexity	0.167	1.9	2.2	1.8	2.2	1.6	2.1	2.0	1.6
Composite Risk	1.000	1.8	1.9	1.8	2.2	1.5	2.0	2.0	1.5
CSMS CARA Rating	Weight	CSMS	CSS DCCI	CSS DCHCI	MSS MCI	MSS MLCI	MSS MACI	MSS MHCI	Ftn. Threads
	n/a	2.7	3.2	2.5	3.5	2.0	2.8	3.0	2.1

EXHIBIT 2-9: CARA Results for CSMS Segment Configuration Items

		CSMS	Criticality Rating											
Criticality Area	Weight	Ftn. Threads	CSMS Ex IF	CSMS Sec	CSMS D Svc	CSMS DTS	CSMS IntPr	CSMS RPC	CSMS F Tr	CSMS I Msg	CSMS DCE	CSMS E Log	CSMS AP&D	CSMS CM
Operations	0.250	1.6	1.9	2.9	1.7	1.5	1.0	1.5	1.4	1.3	1.8	1.0	1.5	1.3
Safety	0.250	1.1	1.1	1.1	1.1	1.1	1.2	1.0	1.0	1.0	1.2	1.1	1.1	1.2
Technical	0.250	1.4	1.8	1.8	1.1	1.3	1.1	1.0	1.1	1.1	2.1	1.2	1.4	1.3
Programmatics	0.250	1.5	2.6	2.4	1.4	1.4	1.0	1.3	1.1	1.1	1.7	1.0	1.9	1.4
Composite Criticality	1.000	1.4	1.9	2.1	1.3	1.3	1.1	1.2	1.2	1.1	1.7	1.1	1.5	1.3
		CSMS	**Risk Rating**											
Risk Driver	Weight	Ftn. Threads	CSMS Ex IF	CSMS Sec	CSMS D Svc	CSMS DTS	CSMS IntPr	CSMS RPC	CSMS F Tr	CSMS I Msg	CSMS DCE	CSMS E Log	CSMS AP&D	CSMS CM
Engineering Complexity	0.167	1.8	2.6	1.7	1.8	1.8	1.3	2.3	1.5	1.6	1.6	1.2	2.1	1.6
Tech Base Maturity	0.167	1.5	1.7	1.9	1.2	2.1	1.0	1.4	1.2	1.0	2.2	1.0	2.0	1.3
Requirements Volatility	0.167	1.2	1.8	1.7	1.0	1.2	1.0	1.0	1.2	1.0	1.4	1.0	1.2	1.2
Experience Base	0.167	1.7	2.2	2.1	1.5	1.9	1.1	1.4	1.3	1.0	2.4	1.4	1.7	2.2
Testability	0.167	1.3	2.2	1.3	1.2	1.4	1.0	1.1	1.2	1.1	1.6	1.0	1.3	1.2
Process Complexity	0.167	1.6	2.1	2.6	1.3	1.9	1.0	1.0	1.3	1.0	2.1	1.0	1.9	1.4
Composite Risk	1.000	1.5	2.1	1.9	1.3	1.7	1.1	1.4	1.3	1.1	1.9	1.1	1.7	1.5
CSMS FT's	Weight	Ftn. Threads	CSMS Ex IF	CSMS Sec	CSMS D Svc	CSMS DTS	CSMS IntPr	CSMS RPC	CSMS F Tr	CSMS I Msg	CSMS DCE	CSMS E Log	CSMS AP&D	CSMS CM
CARA Rating	n/a	2.1	4.0	4.0	1.7	2.2	1.2	1.7	1.6	1.2	3.2	1.2	2.6	2.0

EXHIBIT 2-10: CARA Results for CSMS IR-1 I&T Functional Threads

Criticality		**SDPS**	**Criticality Rating**				
Area	Weight	Overall	INS INGST	DPS AITTL	DPS PRONG	DPS SDPTK	Ftn. Threads
Operations	0.250	1.9	1.9	1.6	2.7	1.3	2.2
Safety	0.250	1.0	1.0	1.0	1.0	1.0	1.0
Technical	0.250	2.0	1.9	2.1	2.1	2.0	1.9
Programmatics	0.250	2.0	2.0	2.0	2.2	1.9	1.9
Composite Criticality	1.000	1.7	1.7	1.7	2.0	1.6	1.8
Risk		**SDPS**	**Risk Rating**				
Driver	Weight	Overall	INS INGST	DPS AITTL	DPS PRONG	DPS SDPTK	Ftn. Threads
Engineering Complexity	0.167	2.2	2.7	1.8	2.5	2.2	2.0
Tech Base Maturity	0.167	1.6	1.8	1.3	1.8	1.7	1.5
Requirements Volatility	0.167	2.2	2.0	2.3	2.5	2.2	2.0
Experience Base	0.167	1.7	1.4	1.7	1.8	1.7	1.8
Testability	0.167	2.0	1.7	2.0	2.4	2.1	1.9
Process Complexity	0.167	1.9	2.3	1.7	2.1	1.9	1.6
Composite Risk	1.000	1.9	2.0	1.8	2.2	2.0	1.8
SDPS	Weight	SDPS	INS INGST	DPS AITTL	DPS PRONG	DPS SDPTK	Ftn. Threads
CARA Rating	n/a	3.2	3.4	3.1	4.4	3.2	3.2

EXHIBIT 2-11: CARA Results for SDPS Segment Configuration Items

Criticality		**SDPS**	**Criticality Rating**				
Area	Weight	Ftn. Threads	SDPS PQ&E	SDPS D Tkt	SDPS AIT T	SDPS T Chk	SDPS T Ing
Operations	0.250	2.2	2.7	2.0	2.2	1.8	2.3
Safety	0.250	1.0	1.0	1.1	1.0	1.0	1.0
Technical	0.250	1.9	2.3	1.7	2.3	1.6	1.6
Programmatics	0.250	1.9	2.1	1.4	2.3	1.9	2.0
Composite Criticality	1.000	1.8	2.0	1.6	2.0	1.6	1.7
Risk		**SDPS**	**Risk Rating**				
Driver	Weight	Ftn. Threads	SDPS PQ&E	SDPS D Tkt	SDPS AIT T	SDPS T Chk	SDPS T Ing
Engineering Complexity	0.167	2.0	2.2	1.9	1.9	1.7	2.2
Tech Base Maturity	0.167	1.5	1.7	1.2	1.8	1.1	1.7
Requirements Volatility	0.167	2.0	2.0	2.0	2.5	1.7	1.8
Experience Base	0.167	1.8	1.7	1.5	1.9	1.9	1.9
Testability	0.167	1.9	2.3	2.3	2.0	1.5	1.5
Process Complexity	0.167	1.6	2.2	1.7	1.3	1.4	1.4
Composite Risk	1.000	1.8	2.0	1.8	1.9	1.5	1.7
SDPS FT's	Weight	Ftn. Threads	SDPS PQ&E	SDPS D Tkt	SDPS AIT T	SDPS T Chk	SDPS T Ing
CARA Rating	n/a	3.2	4.0	2.9	3.8	2.4	2.9

EXHIBIT 2-12: CARA Results for IR-1 SDPS I&T Functional Threads

		IR-1	Criticality Rating					
Criticality Area	Weight	Ftn. Threads	DAAC LAN	ESN WAN	TRMM SPDF	TRMM TSDIS	AI&T Prep	ECS Admin.
Operations	0.250	2.1	2.6	2.1	1.5	2.5	2.0	1.7
Safety	0.250	1.2	1.2	1.2	1.7	1.0	1.0	1.2
Technical	0.250	1.4	1.2	1.1	1.2	1.6	1.7	1.4
Programmatics	0.250	2.0	2.1	2.1	2.1	2.5	1.8	1.4
Composite Criticality	1.000	1.7	1.8	1.6	1.6	1.9	1.6	1.4
		IR-1	**Risk Rating**					
Risk Driver	Weight	Ftn. Threads	DAAC LAN	ESN WAN	TRMM SPDF	TRMM TSDIS	AI&T Prep	ECS Admin.
Engineering Complexity	0.167	1.9	2.0	2.1	1.9	1.5	1.8	1.9
Tech Base Maturity	0.167	1.5	1.5	1.3	1.1	1.5	1.8	1.6
Requirements Volatility	0.167	1.9	1.9	1.8	1.5	2.5	1.5	2.0
Experience Base	0.167	1.8	1.8	1.5	2.0	2.0	2.0	1.4
Testability	0.167	1.4	1.3	1.0	2.0	1.0	1.4	1.5
Process Complexity	0.167	1.6	1.0	1.0	1.7	2.0	2.2	1.5
Composite Risk	1.000	1.7	1.6	1.4	1.7	1.7	1.8	1.6
IR-1 FT's	Weight	Ftn. Threads	DAAC LAN	ESN WAN	TRMM SPDF	TRMM TSDIS	AI&T Prep	ECS Admin.
CARA Rating	n/a	2.9	2.9	2.2	2.7	3.2	2.9	2.2

EXHIBIT 2-13: CARA Results for IR-1 System I&T Functional Threads

3. LIFE CYCLE PHASE DEPENDENT ACTIVITIES

Life cycle phase dependent activities are those performed during specific phases of the ECS development life cycle. Since ECS IR-1 is not following the full life cycle model, only the following major activities will be performed in support of this release:

- Design Evaluation
- Software Development Evaluation
- Implementation Test Evaluation.

The following sections describe in more detail the tasks associated with the major IV&V activities.

3.1 Design Evaluation

Design evaluation consists of examining both the process in which the contractor produced the design for ECS IR-1 and the actual products generated by the effort.

3.1.1 Design Process Evaluation

ECS IR-1 Design Process Evaluation focuses on how the HAIS design process is implemented to produce quality design products on a timely basis. The evaluation examines the design process programmatics (plans, schedules, organization, resource allocation efficacy, personnel capabilities, etc.) and environments (standards, tools, data bases, etc.) to assess the likelihood that the process will (continue to) yield the required design phase end-products. In addition, the evaluation examines the design process *post facto* to identify where the process may have failed and what could be done to improve it for later-release design phases. In this context, IV&V will analyze the design process related documents shown in Exhibit 3-1, conduct hands-on evaluation of the HAIS design environment and tooling, conduct informal interviews with HAIS personnel, and research the literature to identify comparable design efforts which could be used to support predictions of success or failure. The results of these evaluations will be documented in the Technical Analysis Report (TAR) or less formally in the Technical Analysis Memorandum (TAM) as listed in Exhibit 3-1.

Developer Product or Process	Evaluation Process [1]IVVMP; [2]ISVVP	IV&V and Other Products Utilized	IV&V Outputs
ECS Systems Engineering Plan 201/SE1	TBD		0602/IR-1 Final
Methodology for Definition of External Interface 208/SE1	TBD		0602/IR-1 Final
Performance Assurance Implementation Plan 501/PA1	TBD		0602/IR-1 Final
CSMS Segment Release Plan 307/DV2	TBD		0602/IR-1 Final
CSMS Prototyping and Studies Plan 317/DV1	TBD		0602/IR-1 Final
CSMS Prototyping and Studies Progress Plan 318/DV3	TBD		0602/IR-1 Final
SDPS Segment Release Plan 307/DV2	TBD		0602/IR-1 Final
SDPS Prototyping and Studies Plan 317/DV1	TBD		0602/IR-1 Final
SDPS Prototyping and Studies Progress Plan 318/DV3	TBD		0602/IR-1 Final

EXHIBIT 3-1: ECS Products For Review During Design Process Evaluation

3.1.2 Design Product Evaluation

As part of the Design Evaluation phase, the IV&V Team will review various products provided by the ECS contractor. These products will be reviewed and analyzed using processes described in the ISVVP. For IR-1, the products will generated during a period around the Preliminary Design Review (PDR). Exhibit 3-2 lists the products to be analyzed, a reference to the associated review process, and a reference to the Technical Analysis Report (TAR) documenting the results.

Developer Product or Process	Evaluation Process [1]IVVMP; [2]ISVVP	IV&V and Other Products Utilized	IV&V Outputs
CSMS Design Specification 305/DV3	[2] 3.3.2	CSMS Requirements Specification 304/DV1 CSMS Operations Scenarios 605/OP2	0602/IR-1 Final
CSMS Database Design & Database Schema Specifications 311/DV1	[2]3.4.3	CSMS Requirements Specification 304/DV1 CSMS Operations Scenarios 605/OP2	0602/IR-1 Final
SDPS Design Specification 305/DV3	[2]3.3.2	SDPS Requirements Specification 304/DV1 SDPS Operations Scenarios 605/OP2	0602/IR-1 Final
SDPS Database Design & Database Schema Specifications 311/DV1	[2]3.4.3	SDPS Requirements Specification 304/DV1 SDPS Operations Scenarios 605/OP2	0602/IR-1 Final

EXHIBIT 3-2: ECS Products For Review During Design Product Evaluation

3.2 Software Development Evaluation

Software development evaluation consists of the IV&V Team analyzing the environment and procedures utilized by the ECS IR-1 contractor during the unit and system development. In addition, the specific components are evaluated against the applicable requirements, standards, and methodologies.

3.2.1 Development Process Evaluation

ECS IR-1 Development Process Evaluation focuses on how the HAIS development process is implemented to ensure adequate development plans and configuration management control. The evaluation examines the development process plans and the

configuration and data management plans to assess the likelihood that the process will (continue to) yield the required development phase end-products. In addition, the evaluation examines the development process *post facto* to identify where the process may have failed and what could be done to improve it for later-release development phases. In this context, IV&V will analyze the development process related documents shown in Exhibit 3-3. The results of these evaluations will be documented in the Technical Analysis Report (TAR) or less formally in the Technical Analysis Memorandum (TAM) as listed in Exhibit 3-3.

Developer Product or Process	Evaluation Process [1]IVVMP; [2]ISVVP	IV&V and Other Products Utilized	IV&V Outputs
Configuration Management Plan 102/MG1	TBD		0604/IR-1 Final
Configuration Management Procedures 103/MG3	TBD		0604/IR-1 Final
Data Management Plan 104/MG1	TBD		0604/IR-1 Final
Data Management Procedures 105/MG3	TBD		0604/IR-1 Final
Software Development Plan 308/DV2	TBD		0604/IR-1 Final
SDPS Development Plan 329/DV2	TBD		0604/IR-1 Final
CSMS Development Plan 329/DV2	TBD		0604/IR-1 Final

EXHIBIT 3-3: ECS Products For Review During Development Process Evaluation

3.2.2 Development Product Evaluation

As work towards the development of ECS IR-1 continues, the IV&V Team will concentrate on reviewing the components of the system being produced by the contractor. As in the design phase, these components will be reviewed and analyzed using processes described in the ISVVP. For IR-1, the development products will analyzed during the period between the Preliminary Design Review (PDR) and the Element Test Review (ETR). Exhibit 3-4 lists the components to be analyzed, a reference to the associated review process, and a reference to the Technical Analysis Report (TAR) documenting the results.

Developer Product or Process	Evaluation Process [1]IVVMP; [2]ISVVP	IV&V and Other Products Utilized	IV&V Outputs
CSMS:CSS	[2] 3.3.2, 3.4.1		0604/IR-1 Final
CSMS:MSS	[2] 3.3.2, 3.4.1		0604/IR-1 Final
SDPS:INS	[2] 3.3.2, 3.4.1		0604/IR-1 Final
SDPS:DPS	[2] 3.3.2, 3.4.1		0604/IR-1 Final

EXHIBIT 3-4: IR-1 Components

The evaluation during software development then continues by examining the various Configuration Items (CI) associated with the release. Exhibit 3-5 lists the SDPS and CSMS CIs planned for development in support of ECS IR-1.

Developer Product or Process	Evaluation Process [1]IVVMP; [2]ISVVP	IV&V and Other Products Utilized	IV&V Outputs
CSMS:CSS:DCCI	[2] 3.4.1		0604/IR-1 Final
CSMS:CSS:DCHCI	[2] 3.4.1		0604/IR-1 Final
CSMS:MSS:MCI	[2] 3.4.1		0604/IR-1 Final
CSMS:MSS:MHCI	[2] 3.4.1		0604/IR-1 Final
CSMS:MSS:MLCI	[2] 3.4.1		0604/IR-1 Final
CSMS:MSS:MACI	[2] 3.4.1		0604/IR-1 Final
SDPS:INS:INGST	[2] 3.4.1		0604/IR-1 Final
SDPS:DPS:AITTL	[2] 3.4.1		0604/IR-1 Final
SDPS:DPS:PRONG	[2] 3.4.1		0604/IR-1 Final
SDPS:DPS:SDPTK	[2] 3.4.1		0604/IR-1 Final

EXHIBIT 3-5: IR-1 Configuration Items

The ECS Development contractor then expanded these CIs into components which are also evaluated for functionality and other areas by the IV&V Team. Exhibits 3-6 and 3-7 list the IR-1 components for both CSMS and SDPS.

Developer Product or Process	Evaluation Process [1]IVVMP; [2]ISVVP	IV&V and Other Products Utilized	IV&V Outputs
SDPS:INS:INGST			
Automated Network Ingest Client Interface	[2] 3.4.1		0604/IR-1 Final
Polling Ingest Client Interface	[2] 3.4.1		0604/IR-1 Final
SDPS:DPS:PRONG			
Processing Queue Mgmt	[2] 3.4.1		0604/IR-1 Final
SDPS:DPS:AITTL			
Documentation Viewing Tools	[2] 3.4.1		0604/IR-1 Final
Standard Checkers	[2] 3.4.1		0604/IR-1 Final
File Comparison Utility	[2] 3.4.1		0604/IR-1 Final
Profiling Tools	[2] 3.4.1		0604/IR-1 Final
Report Generation Tools	[2] 3.4.1		0604/IR-1 Final
SDPS:DPS:SDPTK			
Status Message Facility Tools	[2] 3.4.1		0604/IR-1 Final
Process Control Tools	[2] 3.4.1		0604/IR-1 Final
File I/O Tools	[2] 3.4.1		0604/IR-1 Final
Coordinate System Conversion Tools	[2] 3.4.1		0604/IR-1 Final
Celestial Body Position Tools	[2] 3.4.1		0604/IR-1 Final
Constant and Unit Conversion Tools	[2] 3.4.1		0604/IR-1 Final
Geo-coordinate Transformation Tools	[2] 3.4.1		0604/IR-1 Final
Ancillary Data Access Tools	[2] 3.4.1		0604/IR-1 Final
Memory Management Tools	[2] 3.4.1		0604/IR-1 Final
Time and Date Conversions	[2] 3.4.1		0604/IR-1 Final
Spacecraft Ephemeris and Attitude Access Tools	[2] 3.4.1		0604/IR-1 Final
Metadata Access Tools	[2] 3.4.1		0604/IR-1 Final
Math Tools	[2] 3.4.1		0604/IR-1 Final
Graphic Tools	[2] 3.4.1		0604/IR-1 Final
HDF-EOS-HDF-API	[2] 3.4.1		0604/IR-1 Final

EXHIBIT 3-6: SDPS Unit Level Components for IR-1

Developer Product or Process	Evaluation Process [1]IVVMP; [2]ISVVP	IV&V and Other Products Utilized	IV&V Outputs
CSS:DCCI:Comm. Facilities			
File Access Service Obj.	[2] 3.4.1		0604/IR-1 Final
Electronic Mail Service Obj.	[2] 3.4.1		0604/IR-1 Final
Virtual Terminal Service Obj.	[2] 3.4.1		0604/IR-1 Final
Bulletin Board Obj.	[2] 3.4.1		0604/IR-1 Final
CSS:DCCI:Object Services			
Message Passing	[2] 3.4.1		0604/IR-1 Final
Time Service	[2] 3.4.1		0604/IR-1 Final
Event Logger Service	[2] 3.4.1		0604/IR-1 Final
Thread Service	[2] 3.4.1		0604/IR-1 Final
Directory Naming Service	[2] 3.4.1		0604/IR-1 Final
Security Service	[2] 3.4.1		0604/IR-1 Final
CSS:DCCI:Distr. Obj. Frwk			
Dev. Support	[2] 3.4.1		0604/IR-1 Final
CSS:DCHCI:Distr. Comp. H/W			
Med. File Server/Enterprise Comm. Server	[2] 3.4.1		0604/IR-1 Final
Med. File Server/Bulletin Board Server	[2] 3.4.1		0604/IR-1 Final
Printer	[2] 3.4.1		0604/IR-1 Final
MSS:MCI:Mgmt App. Services			
Accountability Mgmt:User Registration	[2] 3.4.1		0604/IR-1 Final
Security Mgmt for IR-1	[2] 3.4.1		0604/IR-1 Final
Maps & Collections	[2] 3.4.1		0604/IR-1 Final
Mgmt. Framework (Monitoring, Discovery)	[2] 3.4.1		0604/IR-1 Final
Fault Management for IR-1	[2] 3.4.1		0604/IR-1 Final
Performance Mgmt for IR-1	[2] 3.4.1		0604/IR-1 Final
MSS:MCI:Com Mgmt Svcs			
Mgt. User I/F	[2] 3.4.1		0604/IR-1 Final
OA Tools	[2] 3.4.1		0604/IR-1 Final
Maps & Collections	[2] 3.4.1		0604/IR-1 Final
Mgmt. Framework (Monitoring, Discovery)	[2] 3.4.1		0604/IR-1 Final
DBMS	[2] 3.4.1		0604/IR-1 Final
Startup and Shutdown	[2] 3.4.1		0604/IR-1 Final
MSS:MACI:Comm Mgmt Svcs			
Management Agents	[2] 3.4.1		0604/IR-1 Final
MSS:MLCI:Mgmt App. Svcs			
Configuration Management	[2] 3.4.1		0604/IR-1 Final
MSS:MHCI:Mgmt. Subsystem H/W			
Small File Server/Local Mgmt. Server	[2] 3.4.1		0604/IR-1 Final
Medium File Server/Enterprise Mgmt. Server	[2] 3.4.1		0604/IR-1 Final
Small Workstation/Mgmt. Workstation	[2] 3.4.1		0604/IR-1 Final

EXHIBIT 3-7: CSMS Unit Level Components for IR-1

3.3 Implementation Test Evaluation

Implementation test evaluation requires that the IV&V Team analyze the process and procedures for testing the ECS IR-1, monitor the actual testing activities, and evaluate the results provided by the ECS developer.

3.3.1 Implementation Test Process Evaluation

ECS IR-1 Implementation Test Process Evaluation focuses on how the HAIS test process is implemented. The evaluation examines the implementation test plans for the system and each element as well as the verification plan, facilities plan and the system integration and test plans to assess the likelihood that the process will (continue to) yield the required implementation end-products. In addition, the evaluation examines the implementation test process *post facto* to identify where the process may have failed and what could be done to improve it for later-release implementation test phases. In this context, IV&V will analyze the implementation test process related documents shown in Exhibit 3-8, conduct hands-on evaluation of the HAIS design environment and tooling, conduct informal interviews with HAIS personnel, and research the literature to identify comparable implementation efforts which could be used to support predictions of success or failure. The results of these evaluations will be documented in the Technical Analysis Report (TAR) or less formally in the Technical Analysis Memorandum (TAM) as listed in Exhibit 3-8.

Developer Product or Process	Evaluation Process [1]IVVMP; [2]ISVVP	IV&V and Other Products Utilized	IV&V Outputs
ECS Implementation Plan 301/DV1	TBD		0606/IR-1 Final
ECS Facilities Plan 301/DV1	TBD		0606/IR-1 Final
Verification Plan 401/VE1	TBD		0606/IR-1 Final
ECS System Integration and Test Plan 402/VE1	TBD		0606/IR-1 Final
ECS Overall System Acceptance Plan 409/VE1	TBD		0606/IR-1 Final
Environmental Control Plan 532/PA1	TBD		0606/IR-1 Final
CSMS Integration and Test Plan 319/DV1	TBD		0606/IR-1 Final
CSMS Development Plan 317/DV1	TBD		0606/IR-1 Final
SDPS Integration and Test Plan 319/DV1	TBD		0606/IR-1 Final
SDPS Development Plan 317/DV1	TBD		0606/IR-1 Final

EXHIBIT 3-8: ECS Products For Review During Implementation Test Evaluation

3.3.2 Implementation Test Product Evaluation

During the implementation of ECS IR-1, the IV&V Team will focus on reviewing the associated segment and system test plans, monitoring tests, and once executed, analyzing the test results. Again, implementation activities will follow the procedures and guidelines provided in the ISVVP. For IR-1, the results of the Functional Threads (FTs), both at the Segment and System Levels will be analyzed during the period between the Element Test Review (ETR) and the Consent to Ship Review (CSR). Exhibit 3-9 lists the products to be evaluated during this phase.

Developer Product or Process	Evaluation Process [1]IVVMP; [2]ISVVP	IV&V and Other Products Utilized	IV&V Outputs
Monthly Tabulation of S/W Errors 326/DV3	[2] 2.5.2		Tech. Analysis Memo. (TAM)
CSMS Maintenance and Operations Procedures 609/OP1	[2] 2.5.2		Tech. Analysis Memo. (TAM)
CSMS Integration and Test Report. 324/DV3	[2]3.4.6		0610/IR-1
SDPS Maintenance and Operations Procedures 609/OP1	[2] 2.5.2		Tech. Analysis Memo. (TAM)
SDPS Integration and Test Report 324/DV3	[2] 3.4.6		0610/IR-1
System Integration and Test Report 405/VE3	[2] 3.4.6		0610/IR-1
Maintenance and Ops Procedures 607/OP2	[2] 2.5.2		Tech. Analysis Memo. (TAM)
Training Material 625/OP3	[2] 2.5.2		Tech. Analysis Memo. (TAM)
Programmer's Manual 612/OP3	[2] 2.5.2		Tech. Analysis Memo. (TAM)
ECS Operations Plan 608/OP1	[2] 2.5.2		Tech. Analysis Memo. (TAM)
Operators Manuals 611/OP3	[2] 2.5.2		Tech. Analysis Memo. (TAM)

EXHIBIT 3-9: ECS Products For Review During Implementation Test Evaluation

Appendix A: Task Activity Schedule

The following page contains an inserted schedule which summarizes the activities and deliverables associated with the development analysis of ECS IR-1 Release. Major deliverables are shown and approximate duration of associated subtasks. Normally, Task 6 IV&V activities will center around major program milestones. The milestones that have been identified for IR-1 are as follows:

- Test Readiness Review (TRR) 1 August 1995 (Final Review in Series)
- Element Test Review (ETR) 31 August 1995 (Final Review in Series)
- Consent to Ship Review (CSR) 29 December 1995

The guidelines for the IR-1 Deliverables are as follows:

Deliverable	Document ID	Date Required
Independent Release Verification and Validation Plan (IRVVP), *Final*	0601/IR-1	Task 6 (Start) + 2 Months
Design Evaluation TAR	0602/IR-1	ECS Release A PDR + 3 Months
Software Development Evaluation TAR, *Final*	0604/IR-1	IR-1 System I&T - 1 Month
Test Plans/Procedures Evaluation TAR, *Final*	0606/IR-1	IR-1 System I&T (Start)
Test Results Evaluation TAR	0610/IR-1	IR-1 System I&T (End)

EXHIBIT A-1: IR-1 Related Deliverables

Appendix B: Task Resource Allocation

The following labor categories have been allocated to the Development Analysis of the ECS IR-1 Release:

- Senior Systems Engineer
- Systems Engineer
- Clerical Support.

Exhibit B-1 details the planned allocation of resources per month and per labor category for Task 6, along with the total amount allocated to IR-1 activities.

	1995											**1996**
	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
Sr. Systems Engineer	0.55	1.15	1.70	1.70	2.20	2.15	2.20	2.30	2.30	2.30	2.30	--
Systems Engineer	0.30	0.50	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.50	2.50	--
Clerical	0.15	0.15	--	0.15	--	0.25	--	--	--	--	0.25	--
Total Allocation to IR-1 Activities	1.00	1.80	2.70	2.85	3.20	3.40	3.20	4.30	4.30	4.80	5.05	0.00

EXHIBIT B-1: Planned Resource Allocation for Task 6

Appendix C: Technical Analysis Report (TAR) Formats

This appendix describes the format for each class of Technical Analysis Report (TAR) generated during the EOSDIS IV&V ECS IR-1 Development Analysis:

- EOSDIS IV&V Design Evaluation TAR
- EOSDIS IV&V Software Development Evaluation TAR
- EOSDIS IV&V Implementation Test Planning Evaluation TAR
- EOSDIS IV&V Implementation Test Results Evaluation TAR
- EOSDIS IV&V Technical Analysis Memorandum (TAM)

The EOSDIS IV&V Technical Analysis Memoranda (TAM's) are not formal deliveries. TAM's are generated on an *ad hoc* basis to facilitate early Project visibility into important issues. The TAM format is illustrated on page C-10. TAR's are formal deliveries. Exhibit C-1 allocates each formal deliverable, within the scope of this IRVVP, to the applicable TAR format.

Deliverable#	Deliverable Name	TAR Format Page
0602A	Final Design Evaluation TAR (IR-1)	C-2
0604	Final S/W Development Eval TAR (IR-1)	C-4
0606	Final Test Plans/Proc Eval TAR (IR-1)	C-6
0610	Final Test Eval TAR (IR-1)	C-8

EXHIBIT C-1: Deliverable Allocation to TAR Format

Where TAR page limitations are specified, the word 'goal' should be interpreted to mean: less than or equal to that page count, if possible. The intent is to create hierarchical documents (executive summary, report body, appendices - in increasing order of detail) readily useable by varying management/engineering levels of readership interest.

EOSDIS IV&V Design Evaluation TAR Format

1.0 EXECUTIVE SUMMARY [goal: 2 pgs]

2.0 INTRODUCTION [goal: 3 pgs]
- 2.1 Purpose of the Report
- 2.2 Objective of the Analysis
- 2.3 Scope of the Analysis
- 2.4 Background Information

3.0 ANALYSIS TASKS PERFORMED [goal: 5 pgs]
- 3.1 Design Process Evaluation
- 3.2 Configuration Item Evaluation
- 3.3 Design Object Evaluation
- 3.4 Constraints Affecting the Analysis

4.0 ANALYSIS RESULTS [goal: 20 pgs]
- 4.1 Design Process Evaluation Results
  - 4.1.1 Discussion of Analysis Results
  - 4.1.2 Identified Problems
  - 4.1.3 Potential Issues
- 4.2 Configuration Item Evaluation Results
  - 4.2.1 Discussion of Analysis Results
  - 4.2.2 Identified Problems
    - 4.2.2.1 Traceability
    - 4.2.2.2 Quality
    - 4.2.2.3 Testability
  - 4.2.3 Potential Issues
- 4.3 Design Object Evaluation Results
  - 4.3.1 Discussion of Analysis Results
  - 4.3.2 Identified Problems
    - 4.3.2.1 Traceability
    - 4.3.2.2 Quality
    - 4.3.2.3 Testability
  - 4.3.3 Potential Issues

5.0 CONCLUSIONS [goal: 7 pgs]
- 5.1 Technical Integrity
  - 5.1.1 Design Process
  - 5.1.2 Design Products
- 5.2 User Satisfaction
- 5.3 Trends and Projections

6.0 RECOMMENDATIONS [goal: 3 pgs]

EOSDIS IV&V Software Development Evaluation TAR Format

1.0 EXECUTIVE SUMMARY [goal: 2 pgs]

2.0 INTRODUCTION [goal: 3 pgs]
- 2.1 Purpose of the Report
- 2.2 Objective of the Analysis
- 2.3 Scope of the Analysis
- 2.4 Background Information

3.0 ANALYSIS TASKS PERFORMED [goal: 5 pgs]
- 3.1 Software Development Process Evaluation
- 3.2 Software Development Product Evaluation
- 3.3 Constraints Affecting the Analysis

4.0 ANALYSIS RESULTS [goal: 20 pgs]
- 4.1 Software Development Process Evaluation Results
  - 4.1.1 Discussion of Analysis Results
  - 4.1.2 Identified Problems
  - 4.1.3 Potential Issues
- 4.2 Software Development Product Evaluation Results
  - 4.2.1 Discussion of Analysis Results
  - 4.2.2 Identified Problems
    - 4.2.2.1 Traceability
    - 4.2.2.2 Quality
    - 4.2.2.3 Testability
  - 4.2.3 Potential Issues

5.0 CONCLUSIONS [goal: 7 pgs]
- 5.1 Technical Integrity
  - 5.1.1 Software Development Process
  - 5.1.2 Software Development Products
- 5.2 User Satisfaction
- 5.3 Trends and Projections

6.0 RECOMMENDATIONS [goal: 3 pgs]
- 6.1 Areas Requiring Further Analysis
- 6.2 Recommended Solutions to Important Problems
- 6.3 Risk Management Recommendations

APPENDICES

- A: ECS IR-1 Software Allocation
- B: EOSDIS IV&V Software Development Evaluation Guidelines
- C: Software Development Process Evaluation Details
- D: Software Development Product Evaluation Details
- E: Associated EOSDIS IV&V Technical Analysis Memoranda
- F: List of References
- G: Tools and Data Bases Utilized

EOSDIS IV&V Implementation Test Planning Evaluation TAR Format

1.0 EXECUTIVE SUMMARY [goal: 2 pgs]

2.0 INTRODUCTION [goal: 3 pgs]
- 2.1 Purpose of the Report
- 2.2 Objective of the Analysis
- 2.3 Scope of the Analysis
- 2.4 Background Information

3.0 ANALYSIS TASKS PERFORMED [goal: 5 pgs]
- 3.1 Developer Testing Process Evaluation
- 3.2 Developer Test Plans Evaluation
- 3.3 Constraints Affecting the Analysis

4.0 ANALYSIS RESULTS [goal: 20 pgs]
- 4.1 Developer Testing Process Evaluation Results
  - 4.1.1 Discussion of Analysis Results
  - 4.1.2 Identified Problems
  - 4.1.3 Potential Issues
- 4.*x* Developer *test_type* Test Plans Evaluation Results
  - 4.*x*.1 Discussion of Analysis Results
  - 4.*x*.2 Identified Problems
    - 4.*x*.2.1 Traceability
    - 4.*x*.2.2 Quality
  - 4.*x*.3 Potential Issues

5.0 CONCLUSIONS [goal: 7 pgs]
- 5.1 Technical Integrity
  - 5.1.1 Developer Testing Process
  - 5.1.2 Developer Test Plans
- 5.2 User Satisfaction
- 5.3 Trends and Projections

6.0 RECOMMENDATIONS [goal: 3 pgs]
- 6.1 Areas Requiring Further Analysis
- 6.2 Recommended Solutions to Important Problems
- 6.3 Risk Management Recommendations

APPENDICES

- A: ECS IR-1 Functional Thread and Test Allocation
- B: EOSDIS IV&V Developer Testing Evaluation Guidelines
- C: Developer Testing Process Evaluation Details
- D: Developer Test Plans Evaluation Details
  - D.*x*: Developer *test_type* Test Plans Evaluation Details
- E: Associated EOSDIS IV&V Technical Analysis Memoranda
- F: List of References
- G: Tools and Data Bases Utilized

Note:

x: 1, 2, 3, etc. As needed to discuss all *test_types* addressed in TAR.
test_type: Pre-Integration, Segment Integration, System Integration, Acceptance.

EOSDIS IV&V Implementation Test Results Evaluation TAR Format

1.0 EXECUTIVE SUMMARY [goal: 2 pgs]

2.0 INTRODUCTION [goal: 3 pgs]
- 2.1 Purpose of the Report
- 2.2 Objective of the Analysis
- 2.3 Scope of the Analysis
- 2.4 Background Information

3.0 ANALYSIS TASKS PERFORMED [goal: 5 pgs]
- 3.1 Developer Test Execution Process Evaluation
- 3.3 Developer Test Execution Results Evaluation
- 3.4 Constraints Affecting the Analysis

4.0 ANALYSIS RESULTS [goal: 20 pgs]
- 4.1 Developer Test Execution Process Evaluation
  - 4.1.1 Discussion of Analysis Results
  - 4.1.2 Identified Problems
  - 4.1.3 Potential Issues
- 4.*x* Developer *test_type* Test Execution Results Evaluation
  - 4.*x*.1 Discussion of Analysis Results
  - 4.*x*.2 Identified Problems
  - 4.*x*.3 Potential Issues

5.0 CONCLUSIONS [goal: 7 pgs]
- 5.1 Technical Integrity
  - 5.1.1 Developer Test Execution Process
  - 5.1.2 Developer Test Execution Results
- 5.2 User Satisfaction
- 5.3 Trends and Projections

6.0 RECOMMENDATIONS [goal: 3 pgs]
- 6.1 Areas Requiring Further Analysis
- 6.2 Recommended Solutions to Important Problems
- 6.3 Risk Management Recommendations

APPENDICES

- A: ECS IR-1 Functional Thread and Test Allocation
- B: EOSDIS IV&V Developer Test Results Evaluation Guidelines
- C: Developer Test Execution Process Evaluation Details
- D: Developer Test Execution Results Evaluation Details
  - D.*x*: Developer *test_type* Test Execution Results Evaluation Details
- E: Associated EOSDIS IV&V Technical Analysis Memoranda
- F: List of References
- G: Tools and Data Bases Utilized

Note:

x: 1, 2, 3, etc. As needed to discuss all *test_types* addressed in TAR.
test_type: Pre-Integration, Segment Integration, System Integration, Acceptance.

EOSDIS IV&V Technical Analysis Memorandum (TAM) Format

To: {cognizant person - usually the applicable NASA manager}

From: EOSDIS IV&V Team

Subject: {the topic of this TAM}

1. ***Context*** - {describe the specific configuration(s)/area(s)/document(s)/etc. affected}

2. ***Discussion*** - {discuss specific concerns(s)/reason(s) - what/why - for writing this}

3. ***Recommendations*** - {what do you suggest needs to be done - who/what/why}

4. ***Recommended Distribution*** - {who else should receive this - organization/name}

Originator:

_____
{typed name}
EOSDIS IV&V Analyst

Approved:

_____
{typed name}
EOSDIS IV&V Task Lead

Appendix D: List of References

IV&V Documents

[1] Deliverable 0301 — EOSDIS Independent Verification and Validation (IV&V) Management Plan, December 2, 1994

[2] Deliverable 0302 — Independent System Verification and Validation Plan (ISVVP), December 15, 1994

ECS Documents

[3] 101-101-MG1-001 — Project Management Plan for the EOSDIS Core System, July 1993

[4] FB9403V4 — Release Plan Content Description (White Paper), September 1994

[5] 194-201-SE1-001 — Systems Engineering Plan for the ECS Project, June 1994

[6] 194-301-DV1-002 — System Implementation Plan for the ECS Project, June 1994

[7] 304-CD-002-001 — Science and Data Processing Segment (SDPS) Requirements Specification for the ECS Project, January 1995

[8] 304-CD-003-001 — Communications and System Management Segment (CSMS) Requirements Specification for the ECS Project, December 1994

[9] 305-CD-002-001 — Science and Data Processing Segment (SDPS) Design Specification for the ECS Project, January 1995

[10] 305-CD-003-001 — Communications and System Management Segment (CSMS) Design Specification for the ECS Project, December 1994

[11] 307-CD-002-001 — Science and Data Processing Segment Release and Development Plan for the ECS Project, January 1995 (329-CD-002-001)

[12] 307-CD-003-001 — Communications and Systems Management Segment (CSMS) Release and Development Plan for the ECS Project, February 1995 (329-CD-003-001)

[13] 308-CD-001-003 Software Development Plan for the ECS Project, December 1994

[14] 319-CD-002-001 Science and Data Processing Segment (SDPS) Integration and Test Plan for the ECS Project, Volume 1:IR-1, January 1995

[15] 319-CD-003-001 CSMS Integration and Test Plan for the ECS Project, Volume 1: IR-1, December 1994

[16] 402-CD-001-002 System Integration and Test Plan for the ECS Project, Volume 1: Interim Release 1 (IR-1), February 1995

Appendix E: Tools and Data Bases Utilized

Task 6 activities will utilize a number of tools during the analysis and evaluations of IR-1 products and processes. Table E-1 provides a brief subset of the tools described in the Independent System Verification and Validation Plan (ISVVP) **[2]** which will support Task 6.

Tool	Utilization
RTM	Analyze requirements and traceability to tests and design using exports from ECS contractor.
ClearCase	Evaluate software development (builds/releases) and configuration management activities.
Automated Requirements Database (ARDB)	Maintain requirement evaluations, tailored also to support CARA effort.
Issue/Discrepancy Handling System (IDHS)	Store and maintain IR-1 issues and discrepancies.
Mosaic/NetScape	Access EDHS and download necessary files.
Microsoft Project	Provide task schedules

EXHIBIT E-1: Tools to be Utilized During IR-1 Development Analysis

Additional tools will be identified and used as required. Any tools used during Task 6 activities will be documented in the corresponding TARs.

Appendix F: List of Acronyms

CARA	Criticality Analysis And Risk Assessment
CERES	Clouds and Earth's Radiant Energy System
CIs	Configuration Items
CSCI	Computer Software /Configuration Item
CSMS	Communication and System Management Segment
CSR	Consent To Ship Review
DAAC	Data Analysis and Archive Center
DPS	Data Processing Subsystem
ECS	EOSDIS Core System
EDHS	ECS Data Handling System
ESN	EOSDIS Science Network
ETR	Element Test Review
FTs	Functional Threads
GSFC	Goddard Space Flight Center
HAIS	Hughes Applied Information Systems
I&T	Integration and Test
IDHS	Issue Discrepancy Handling System
IR-1	Interim Release 1
IRVVP	Independent Release Verification and Validation Plan
ISVVP	Independent System Verification and Validation Plan
IV&V	Independent Verification And Validation
L0	Level 0
L1	Level 1
LAN	Local Area Network
LaRC	Langley Research Center
LIS	Lightning Image Sensor
MSFC	Marshall Space Flight Center
PDR	Preliminary Design Review
PR	Precipitation Radar
SDPF	Sensor Data Processing Facility (GSFC)
SDPS	Science and Data Processing Segment
TAM	Technical Analysis Memorandum
TAR	Technical Analysis Report
TBD	To Be Determined
TMI	TRMM Microwave Image
TRMM	Tropical Rainfall Measurement Mission
TSDIS	TRMM Science Data and Information System
VIRS	Visible Infrared Scanner (TRMM)
WAN	Wide Area Network